FCE_CRC_1
for KIT_AURIX_TC397_TFT
FCE CRC calculation

AURIX™ TC3xx Microcontroller Training
V1.0.1

Scope of work

The FCE module is used to calculate the CRC of a message with a CRC32 algorithm.

This training shows how to configure the FCE to calculate CRC of a known message with a CRC32 algorithm. The FCE interrupt is enabled to report execution errors. Any CRC kernel calculation error is indicated by switching ON an LED.

Introduction

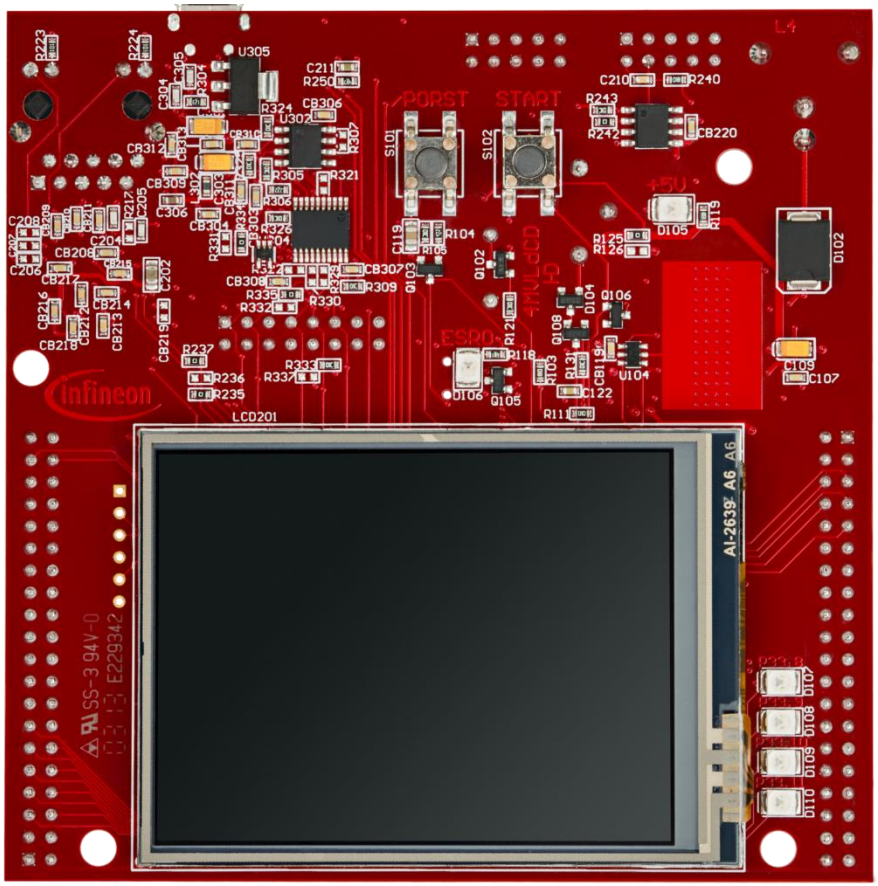
- The Flexible CRC Engine (FCE) provides a parallel implementation of Cyclic Redundancy Code (CRC) algorithms.

- FCE module supported algorithms:
  - IEEE 802.3 Ethernet CRC32 polynomial (used in this example)
  - AUTOSAR safety polynomial CRC32P4
  - CCITT CRC16 polynomial
  - SAE J1850 CRC8 polynomial

- CRC algorithms are used to calculate message signatures that can be used to check message integrity during transport over communication.

Hardware setup

This code example has been developed for the board KIT_A2G_TC397_5V_TFT.



Implementation

Initialization

The initialization of the module is done via ***init_FCE_CRC()***, which contains:

- the FCE module initialization, using the function ***IfxFce_Crc_initModule()***
- the CRC algorithm initialization, using the function ***IfxFce_Crc_initCrc()***

Execution

The execution is started with the function ***run_FCE_CRC()***, which calculates CRC32 algorithm using ***IfxFce_Crc_calculateCrc()*** function.

All functions, needed for using the FCE CRC calculation, are provided by the iLLD header ***IfxFce_Crc.h***.

FCE Error Interrupt Service Routine

The ISR will be executed in case of a CRC calculation error. It will scan the kernel status register and check if the error flag is set.

Implementation

Configure and control the LED

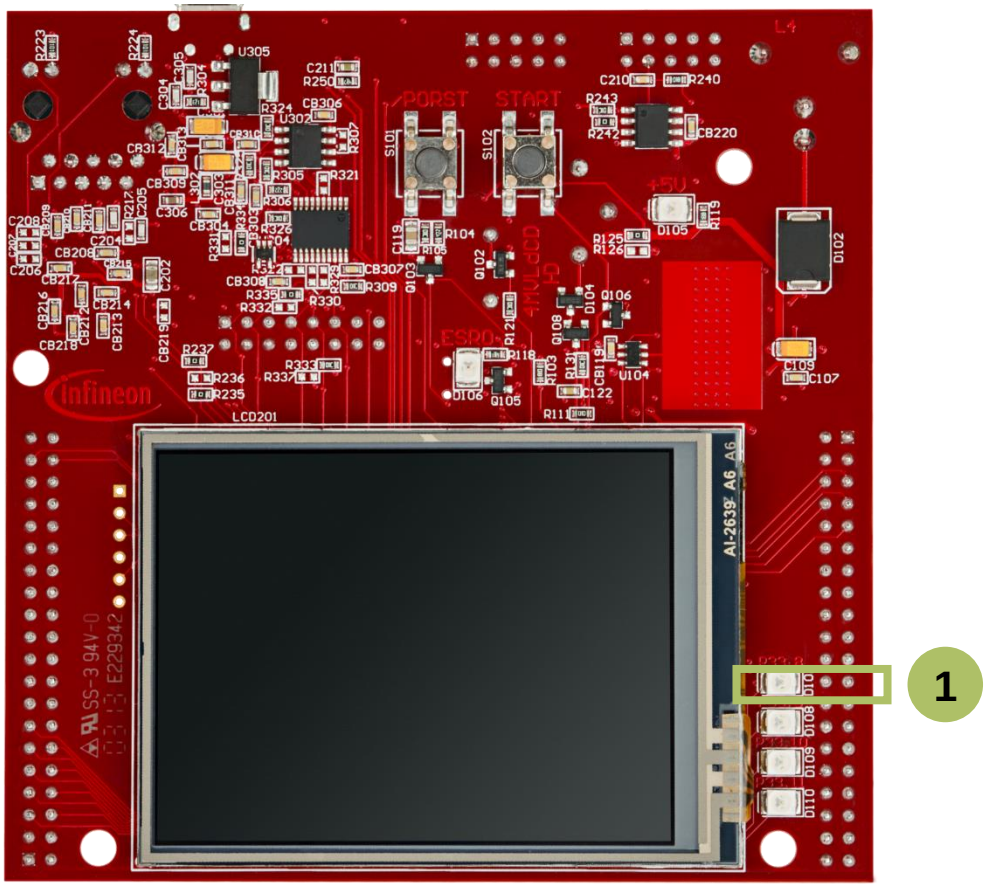
An LED is configured to be switched on/off by the **controlling port pin** to which it is connected using methods from the iLLD header ***IfxPort.h***.

In the setup phase, the port pin of the LED has to be **configured as push-pull output** using the function ***IfxPort_setPinMode()***.

If CRC calculation errors occur, the LED is **switched on** using the function ***IfxPort_setPinLow()***.

Run and Test

After code compilation and flashing the device, observe the LED behavior. The LED (1) should be switched **Off** if the CRC algorithm calculation is correct (Result = Expected)



Run and Test

- LED behavior in case of Error:
  - CRC32 calculation error: **D107** switches On
    - Could be tested by setting the macro ***CRC_WRONG_CHECK_VAL*** to 1

- The macro mentioned above is provided only for test purpose. It allows to pass a wrong expected value to the FCE CRC kernel which leads to a mismatch with the calculated one, therefore the error flag will be set and the error interrupt will be triggered.

References

- AURIX™ Development Studio is available online:
- https://www.infineon.com/aurixdevelopmentstudio
- Use the *„Import...“* function to get access to more code examples.

- More code examples can be found on the GIT repository:
- https://github.com/Infineon/AURIX_code_examples

- For additional trainings, visit our webpage:
- https://www.infineon.com/aurix-expert-training

- For questions and support, use the AURIX™ Forum:
- https://www.infineonforums.com/forums/13-Aurix-Forum

Revision history

Revision	Description of change
V1.0.1	Update of version to be in line with the code example’s version
V1.0.0	Initial version

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